

**METHODS OF FORMING POWER SEMICONDUCTOR DEVICES
USING BOULE-GROWN SILICON CARBIDE DRIFT LAYERS
AND POWER SEMICONDUCTOR DEVICES FORMED THEREBY**

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Abstract of the Disclosure

Methods of forming high voltage silicon carbide power devices utilize high purity silicon carbide drift layers that are derived from high purity silicon carbide wafer material, instead of prohibitively costly epitaxially grown silicon carbide layers. The methods include forming both minority
10 carrier and majority carrier power devices that can support greater than 10kV blocking voltages, using drift layers having thicknesses greater than about 100 um. The drift layers are formed as boule-grown silicon carbide drift layers having a net n-type dopant concentration therein that is less than about $2 \times 10^{15} \text{ cm}^{-3}$. These n-type dopant concentrations can be
15 achieved using neutron transmutation doping (NTD) techniques.

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